

# Abstract

The Maui Space Surveillance Site (MSSS) is located on the summit of 10,000 foot *Haleakala* on the island of Maui, Hawaii. The MSSS Observatory includes the Air Force Maui Optical Station (AMOS), a national resource providing measurement support to various government agencies and the scientific community. It also includes the Ground-based Electro-optical Deep Space Surveillance system (GEODSS).

The MSSS is a state-of-the-art electro-optical facility. It combines large-aperture tracking optics with visible and infrared sensors to collect data on sub-orbital, near earth and deep space objects. Optical equipment at MSSS includes a 3.6 meter telescope, a 1.6 meter telescope, two 1.2 meter telescopes on a common mount, a 0.8 meter beam director/tracker and a 0.6 meter laser beam director. The telescopes support a wide variety of sensor systems, including compensated and uncompensated imaging systems, conventional and contrast mode photometers, infrared radiometers, low light level video systems and acquisition telescopes.

This manual presents a summary of AMOS systems, capabilities and support procedures. It includes a description of the kinds of mission objectives that can be satisfied, and the procedures to be used for requesting support. Pre-mission planning and data reporting procedures are also discussed. A section of the manual is dedicated to the visiting experimenter, whether planning a site visit or an extended stay for research. An acronym list and glossary is included in the appendices.

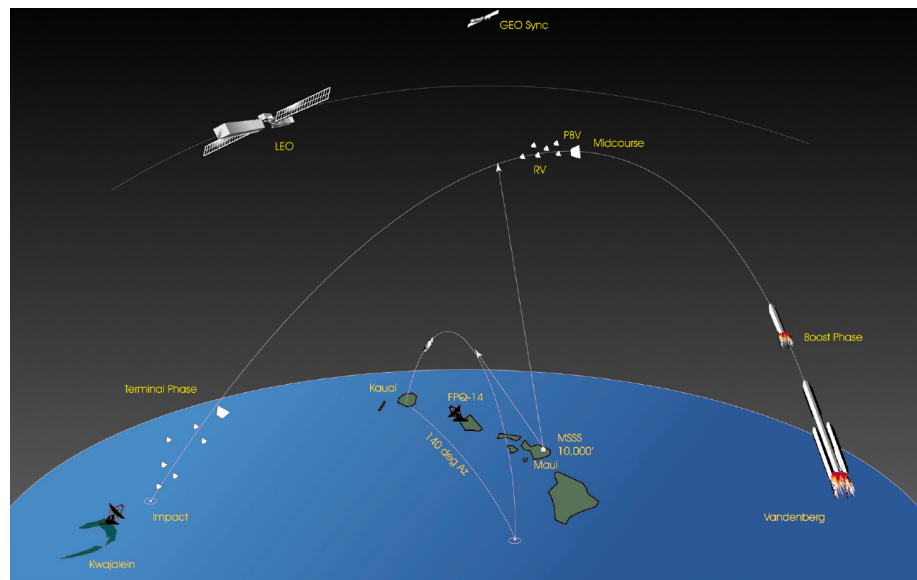
The technical and administrative support facility is located in the Maui Research and Technology Park in Kihei, Maui. The Premier Place building houses employee offices, a technical library and meeting rooms including a conference room connected to the MSSS with a two-way microwave teleconferencing link. The Maui High Performance Computing Center (MHPCC) is located in the same Park.

## Section 1 - INTRODUCTION

### AMOS

The Observatory complex, the Maui Space Surveillance Site, includes AMOS and a contiguous GEODSS facility. GEODSS shares some of the AMOS resources but is otherwise an independent entity. The combined MSSS facilities have measurement capabilities that exploit its:

- Unique vantage point for observing sub-orbital vehicles, launched from Vandenberg Air Force Base, rockets launched from Barking Sands on the neighboring island of Kauai and endoatmospheric targets such as aircraft and missile simulator drones, as shown in Figure 1-1.
- Favorable low-latitude location ( $20.7^{\circ}$  N) for satellite measurements.
- Excellent atmospheric characteristics for an observatory.
- Ease of access for visiting experimenters.



**Figure 1-1, Favorable Geographic Location of AMOS**

Operation and maintenance of AMOS, subsystem integration, and modification of existing subsystems are the primary responsibilities of Rocketdyne Technical Services (RTS), a Boeing Company. Additional RTS responsibilities include mission planning, scheduling, and the reduction, interpretation and analysis of data recorded at AMOS.

The main field office building at the Maui Research and Technology Park, Kihei HI, includes optical and electronic laboratories, data processing, and administrative functions. An Operating Location of the Air Force Research Lab (AFRL/DEBI) and Detachment 3, 18th Space Surveillance Squadron (SPSS) are Air Force offices located in the same building. Purchasing, shipping, and receiving functions are located in nearby Kahului, Maui.

The Air Force Materiel Command's Air Force Research Lab (AFRL/DEBI), Kirtland Air Force Base NM, sponsors the AMOS Program. The objectives of the AMOS Program are to:

- Provide state-of-the-art measurement support to various government agencies and the scientific community for research and development programs;
- and serve as a test-bed for newly developed evolving electro-optical sensors.

AMOS consists of the observatory's premier optical instrument, the 3.6 Meter telescope, the sensors mounted on it, the 1.6 Meter telescope, the 1.2 Meter telescope, and two smaller telescopes, the 0.8 Meter and the 0.6 Meter. These assets are detailed in Section 3. The sensors are described in detail in Section 4. The primary mission of these telescopes is to track man made satellites while recording their orbital parameters (metrics), radiation properties (signatures) and forming images for space object identification (SOI).

Contiguous with AMOS is the Ground-based Electro-Optical Deep Space Surveillance (GEODSS) System, a three-telescope operational system with computer support that provides a capability to look into deep space, 3,000 to 23,000 miles (4,800 km to 37,000 km) where many communication, weather, and surveillance satellites orbit. Two of the telescopes have approximately 1 meter apertures and adjustable fields-of-view from 1° to 2°. The third has a 0.6 meter aperture and a 3° to 6° adjustable field-of-view. For the purposes of this User's Manual, GEODSS will be considered a separate facility.

## **Requests for Support**

Requests for AMOS support should be directed to:

AMOS Program Office  
Air Force Research Laboratory/DEBI  
535 Lipoa Parkway  
Kihei HI 96753  
(808) 874-1541

Initial contact with AMOS should be made through the AFRL/DEBI VE Programs Manager at (808) 874-1541. Requests for access to AMOS program information and/or visits to the MSSS should be processed through AFRL/DEBI.